

REMARKS

Claims 1-3, 5-30 and 32-36 are pending in this application. The drawings were objected to due to certain informalities. Claims 1-3, 5, 10-12, 14-22, 26-30 and 32-35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kuribayashi in view of Roberts. Claims 1-3, 5, 10-13, 16-30 and 32-35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Peterson in view of Roberts. Claims 6-9 and 36 were rejected under 35 U.S.C. §103(a) as being unpatentable over either Kuribayashi or Peterson in view of Roberts and Kato. Formal drawings have been submitted herewith. No amendments have been made to the claims. Reconsideration of all rejections in view of the following remarks is respectfully requested.

The drawings were objected to by the draftsman as including various informalities. With this response, applicant has submitted formal drawings which correct the noted informalities. No changes have been made to the figures, other than arranging the Figures more efficiently on the pages. The objection to the drawings have been overcome and should be withdrawn.

All of the claims were rejected as obvious in view of either Kuribayashi for Peterson in view of Roberts. Applicant respectfully traverses the rejections because the cited art does disclose, teach or suggest the claimed features of the present invention. The present claimed invention relates to a laser diode assembly having certain characteristics for thermal control. None of the cited art teaches or suggests these characteristics for thermal control. Instead, the Office Action relies upon allegedly inherent content of the cited art. However, the cited art does not inherently include these elements.

Specifically, the claims recite a laser diode assembly including a laser diode with electrical connections on the top and bottom surfaces. This is a known structure for a laser

diode. Other known structures include the electrical connections solely on the top of the laser diode. While Peterson discloses the type of laser diode recited in the claims, Kuribayashi discloses the other type.

The claims further recite the use of at least two thermally conductive pads on the top of the laser diode. Bonding wires are used to connect the thermally conductive pads to a thermally conductive layer on a carrier. None of the cited art discloses the use of thermally conductive pads or bonding wires for thermal conductivity, much less the use of at least two thermally conductive pads. The Office Action merely states that the electrical wires and bonding pads are typically formed of metal and would carry heat as well as electricity. The Office Action further states with respect to claim 22 (pages 5-6 of the Office Action), that “wires that are used purely for heat transfer are known in the art. It would have been obvious to include on such wire with the other wires in order to dissipate heat from the laser diode and send it to the cooling system.” The Office Action fails to provide any support for this allegedly well known feature. The claims specifically recite the use of bonding wires for connecting thermally conductive pads on the top of the laser diode to a thermally conductive layer on the carrier. The rejection of the claims based upon an unsupported assertion that these elements are well known is improper.

Kuribayashi discloses a module having a peltier element. As illustrated in Fig. 5, the laser diode 18 of Kuribayashi has two terminals on the top. Kuribayashi does not disclose the recited laser diode structure with a bottom being electrically coupled to the carrier. Instead, the wires 24, 26 are coupled to the anode and cathode of the laser diode. The carrier does not provide an electrical connection.

Futhermore, Kuribayashi does not disclose, teach or suggest the use of a thermally conductive layer in the carrier, at least two thermally conductive pads on the laser diode, or bonding wires for connecting the thermally conductive pads to the thermally conductive layer. The Office Action acknowledges that Kuribayashi does not even disclose pads for connecting the electrical bonding wires to the laser diode. Instead it assumes that such pads are inherent because such pads are necessary. Furthermore, the Office Action asserts that the pads and wires are metallic and would be thermally conductive. However, such a feature is not taught or suggested by Kuribayashi. The assembly in Kuribayashi uses the peltier element placed below the laser diode for thermal dissipation. Nothing teaches or suggests that the bonding wires used for electrical connections provide any thermal connection. Therefore, the rejection of the claims is improper and should be withdrawn.

Finally, the Office Action notes that Kuribayashi does not disclose use of at least two pads on the top of the laser diode. Instead, the Office Action relies upon Roberts as disclosing use of multiple pads. Roberts does not disclose the use of multiple thermally conductive pads. Instead, Roberts discloses the use of redundant pads and bonding wires for electrical connections in the event that one or more connections fails. There is nothing in Kuribayashi or Roberts which teaches or suggests the use of two thermally conductive pads on the top of the laser diode with bonding wires attaching the pads to a thermally conductive layer of a carrier. Accordingly, the claims patentably distinguish over the cited art and are in condition for allowance.

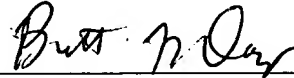
Similarly, Peterson does not disclose, teach or suggest the present claimed invention. Peterson discloses a structure similar to the prior art set forth in the present application. The laser diode is electrically connected on a bottom surface through a thermal spreader 25 to an

electrical contact 34 on the carrier. The thermal spreader is also positioned on a thermally conductive submount 18 for passing heat from the thermal spreader to the heat sink 16. Bonding wires attach the top surface of the diode to a second electrical contact 32. Peterson does not disclose or suggest that the bonding wires are used for thermal transfer. The thermal spreader 25 on the bottom surface of the laser diode is used for that purpose. The Office Action seeks to rely upon the fact that the bonding wires and electrical contact 34 are metal and, thus, may conduct heat. However, Peterson teaches away from using the bonding wires for heat transfer with the use of the thermal spreader for the heat transfer. Therefore, the present claimed invention patentably distinguishes over Peterson.

As with Kuribayashi, the use of Roberts in combination with Peterson does not overcome the deficiencies of Peterson with respect to the present claimed invention. Roberts does not disclose the use of thermal bonding wires nor of a thermally conductive layer in the carrier. Accordingly, the present claims patentably distinguish over the Peterson and Roberts.

Based on the foregoing, this application is believed to be in allowable condition, and a notice to that effect is respectfully requested. If the Examiner has any questions, he is invited to contact the Applicant's undersigned attorney at the number provided below.

Respectfully submitted,



Brett N. Dorny
Registration No. 35,860
Mintz, Levin, Cohn, Ferris,
Glovsky and Popeo, P.C.
One Financial Center
Boston, Massachusetts 02111
Telephone 617/542-6000
Attorney for Applicant

Date: November 20, 2003